Teledermatology as an Educational Tool for Teaching Dermatology to Residents and Medical Students

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Abstract

Although teledermatology (TD) is regarded as a tool to improve patient access to specialty healthcare, little has been done to evaluate its role in medical education. We describe the TD program at the Denver (CO) Department of Veterans Affairs Medical Center and evaluate its use as an educational tool for teaching dermatology to dermatology residents and medical students. Dermatology residents manage TD consultations and review all cases with a faculty preceptor; medical students participate as observers when possible. This study assessed dermatology resident (n = 14) and medical student (n = 16) perceptions of TD and its usefulness in teaching six core clinical competencies. Both residents (79%) and medical students (88%) “strongly agree” or “agree” that TD is an important educational tool. In general, medical students were slightly more satisfied than residents across all of the core competencies assessed except for patient care. Medical students and residents were most satisfied with the competencies of practice-based learning and improvement and medical knowledge, whereas they were least satisfied with those of interpersonal and communication skills and professionalism. Overall, TD is valued as a teaching tool for dermatology in the areas of patient care, medical knowledge, practice-based learning and improvement, and systems-based practice.

Key words: teledermatology, education, dermatology, telemedicine

Background

Teledermatology (TD) is regarded as a tool to improve patient access to specialty healthcare, but little has been done to evaluate its role in medical education. Previous studies describe the use of TD to provide dermatologic training for internal medicine and pediatric residents when there is a lack of substantial on-site opportunities to learn dermatology.^{1,2} In addition, TD has served as a useful means to supervise general practitioners and dermatology residents.^{3,4} One investigation reported that general practitioners found 63% of their teleconsultations to be of educational value.⁵ We describe the TD program at the Denver (CO) Department of Veterans Affairs Medical Center (VAMC) and evaluate its use as an educational tool for teaching dermatology.

TD at the Denver VAMC uses the store-and-forward modality, which involves the acquisition of clinical information that is stored and forwarded to another clinical site for evaluation; this does not allow for the live interaction between patient and provider that is offered by the real-time TD system.⁶ Dermatology residents initially evaluate cases independently and then review and finalize consultations with a faculty preceptor. When available, medical students participate as observers. The Denver VAMC TD program has experienced dramatic growth in recent years through the addition of imaging capability at additional referring clinics in Montana, Wyoming, and Colorado. This is demonstrated by the caseload increasing from 240 consults in 2010 to 1,098 consults in 2013. Of TD consults received in 2013, 69% received recommendations to be addressed locally by the primary care physician, whereas only 31% of consults required a face-to-face dermatology evaluation. Of the 517 cases with data available, benign tumors (31%), actinic keratoses (30%), and basal cell carcinomas (15%) were the top three diagnoses, with many cases having more than one diagnosis.

Materials and Methods

The goal of this study was to assess dermatology residents' and medical students' perceptions of TD and its usefulness in teaching six core clinical competencies. This was done via an electronic survey (Institutional Review Board approved protocol number 14-0149) administered during January 2014 to all dermatology residents and medical students who worked in the VAMC clinics during 2013. The six core competencies defined by the Accreditation Council for Graduate Medical Education are as follows: patient care; medical knowledge; practice-based learning and improvement (use of information technology to access data important for patient care);

interpersonal and communication skills; professionalism (communication with the referring physician); and systems-based practice (knowledge of the cost effectiveness and quality of medical care).⁷⁻⁹ The core competency responses were assigned a weight value (very satisfied = 5, satisfied = 4, neutral = 3, dissatisfied = 2, very dissatisfied = 1), and the average response weight was calculated for all respondents.

Results

The response rate for residents was 82% (14 of 17 residents) and for medical students was 71% (22 of 31 students). Of the students who responded, 16 participated in TD during their rotation. Overall, both residents (79%) and medical students (88%) agreed that TD served as a valuable educational tool for dermatology. In general, medical students were slightly more satisfied than residents across all of the core competencies except for patient care (Fig. 1). Medical students and residents were most satisfied with competencies of practice-based learning and improvement and medical knowledge. More specifically, 85% of residents were “very satisfied” or “satisfied” with the ability of TD to cover core educational competencies in patient care, medical knowledge, and practice-based learning and improvement. Ninety-four percent of medical students were “very satisfied” or “satisfied” that participation in TD improved their medical knowledge and practice-based learning and improvement. Interpersonal and communication skills and professionalism received the lowest average satisfaction ratings from both medical students and residents alike. Only half (53%) of residents and students

were satisfied with TD as a tool for improving interpersonal communication. The majority of residents were “neutral” about the ease of use of the TD system. Despite the fact that only 1.7% of all images were classified as unreadable, only 50% of residents were “very satisfied” or “satisfied” with the quality of digital images sent for consultation.

Discussion

The current role and utility of TD in medical education are evolving and have much potential. We hypothesize that medical students were more satisfied with TD because it allowed them to review a large number of high-yield cases with an attending in a short time frame without added workload. Comparatively, residents assumed the primary responsibility for completing consult notes within the VistA imaging system (Department of Veterans Affairs).

Residents use information sources other than immediate faculty feedback when formulating the initial TD differential diagnosis and treatment plan.⁷ This likely contributes to both increased medical knowledge and improvement in practice-based learning. In addition, making a diagnosis based solely on a clinical image simulates the testing environment of in-service and board certification examinations, thus helping to better prepare residents for these testing situations.⁷

This study was limited by the small sample size, limiting the generalizability of the results. Also, inter-respondent variation regarding the extent and type of their TD interaction was not assessed. This could impact their level of comfort, confidence, and experience

with the technology, thus influencing their perceptions. Limitations of TD in general include the inability to palpate skin, perform bedside diagnostic tests, and ask follow-up questions.⁷ Also, the store-and-forward technology inhibits direct patient and provider contact. These aspects of TD may be reflected in the fact that it scored relatively poorly as a tool for developing interpersonal and communication skills and professionalism. It would be a worthwhile comparison to assess how perceptions of these two core competencies are impacted by using the live-interactive TD system. Imaging and usability may also improve with technological advances and possible implementation of additional imaging aids such as dermoscopy and Google (Mountain View, CA) Glass.^{6,10}

In the future, a larger sample size would increase the generalizability of these results. However, the inconsistent use of TD across institutions and the variation in its implementation represent challenges. Also, regional variation in telemedicine reimbursement laws may impact its viability

Fig. 1. Rating of tele dermatology across six core competencies by residents and medical students. (a) Responses were assigned a weight value (very satisfied = 5, satisfied = 4, neutral = 3, dissatisfied = 2, very dissatisfied = 1, and then the average response weight was calculated for all respondents.

in certain geographic areas.^{11,12} As TD continues to improve and increase in presence, its role in medical education will continue to evolve.

Disclosure Statement

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